

IN THE CLAIMS:

The following is a complete listing of claims in this application.

1. (previously presented) The method according to claim 17, wherein said step of processing comprises:

encapsulating said tagged segment into a Point-to-Point Protocol (PPP) packet in a frame; and

mapping the encapsulated packet into a transmission frame for transmission over an optical fiber.

2. (original) The method according to claim 1, wherein said tagged segment is encapsulated into a PPP packet in a High bit rate Digital Link Control (HDLC)-like frame.

3. (original) The method according to claim 1, wherein said transmission frame is a Packet over SONET (PoS) frame.

4. (original) The method according to claim 1, wherein said transmission frame is a Packet over SDH (PoS) frame.

5. (original) The method according to claim 2, wherein said transmission frame is a Packet over SONET (PoS) frame.

6. (original) The method according to claim 2, wherein said transmission frame is a Packet over SDH (PoS) frame.

7. (original) The method according to claim 3, further comprising the step of scrambling the encapsulated packet before the step of mapping into a transmission frame.

8. (original) The method according to claim 1, wherein said step of adding a tag includes adding an MPLS tag.

9. (original) The method according to claim 1, further comprising the steps of:

de-packing said transmission frame in a receiver to retrieve said encapsulated PPP packet;

de-capsulating said encapsulated PPP packet to retrieve said tagged segment of a bit stream; stripping off the tag to retrieve said segment of a bit stream; and

assembling a plurality of said segments to re-create the

original bit stream.

10. (original) The method according to claim 9, further comprising the step of unscrambling a scrambled encapsulated PPP packet, after the step of de-packing.

11. (previously presented) The method according to claim 5, further comprising the steps of:

de-packing said Packet over SONET packet in a receiver to retrieve said encapsulated PPP packet in HDLC-like form;

de-capsulating said encapsulated PPP packet to retrieve said tagged segment of a bit stream;

stripping off the tag to retrieve said segment of said bit stream; and

assembling a plurality of said segments to re-create the original bit stream.

12. (previously presented) The engine according to claim 19, wherein said processing modules comprise:

an encapsulating module for encapsulating the tagged segment into a Point-to-Point Protocol (PPP) packet in a frame; and

a mapping module for mapping the encapsulated packet into a transmission frame for transmission over an optical fiber.

13. (original) The engine according to claim 12, wherein said PPP packet is encapsulated in a High bit rate Digital Link Control (HDLC)-like frame.

14. (original) The engine according to claim 12 wherein said transmission frame is a Packet over SONET/SDH (PoS) frame.

15. (original) The engine according to claim 13 wherein said transmission frame is a Packet over SONET/SDH (PoS) frame.

16. (previously presented) The engine according to claim 12, wherein said tagging module is arranged to add an MPLS tag to each segment.

17. (currently amended) A method for packet processing for data transmission over an optical fiber, the method comprising the steps of:

receiving and identifying ~~at least two~~ incoming bit streams of data, each containing ~~one service~~ at least two services;

segmenting each said bit stream in its original protocol into variable length segments;

adding a tag to each segment, each tag including data identifying a route between a source and a destination end-point of its bit stream so as to identify the service of the segment; and

processing ~~each of said~~ tagged segments from at least two of said bit streams into a single ~~transmission frame~~ packet for transmission.

18. (previously presented) The method according to claim 17, wherein two of said incoming bit streams of data contain different services.

19. (currently amended) An engine for packet processing and data transmission ~~with optimization of available bandwidth capacity~~, the engine comprising:

~~at least two service ports, each~~ means for receiving and identifying ~~an~~ incoming bit ~~stream~~ streams of data containing ~~one service~~ at least two services;

a segmentation module for segmenting said bit streams in its original protocol into variable length segments;

a tagging module for adding a tag to each segment, each tag including data identifying a route between a source and a destination end-point of its bit stream so as to identify the service of the segment; and

at least one processing module for processing ~~said~~ tagged segments from at least two of said bit streams into a single ~~transmission frame~~ packet for transmission.

20. (previously presented) The method according to claim 17, wherein two of said incoming bit streams of data contain the same service.

21. (new) The method according to claim 17, further comprising:

adding a routing tag to the packet; and

inserting a plurality of said packets into a transmission frame for transmission.